

## **TRANSIMPEDANCE AMPLIFIER WITH ADJUSTABLE OUTPUT AMPLITUDE AND WIDE INPUT DYNAMIC-RANGE**

### **ABSTRACT**

A transimpedance amplifier circuit comprising transistors, a constant current source, a load resistor, and the feedback resistor with a shunt circuitry consisting of the additional transistors, which are driven for example with electrically adjustable voltage sources. In a bipolar npn implementation the amplifier stage consists of a common emitter input transistor Q1, a transistor Q2 with its base connected to the collector of the first transistor operates as an emitter follower. A resistor  $R_F$  connected between the emitter of said second transistor and the base of said first transistor provides a voltage controlled current feedback from the amplifier output to its input. The output voltage  $V_{OUT}$  is generated at the emitter node of said second transistor. A shunt circuitry consists of a third and a fourth transistor Q3 and Q4 connected in shunt across resistor  $R_F$ . In an embodiment, the base node voltages of the transistors Q3 and Q4 are adjusted by control voltage sources. By means of an appropriate implementation of these voltage sources the maximum and minimum limits of the output voltage  $V_{OUT}$  is defined, which can easily be implemented with arbitrary temperature or supply voltage dependency.